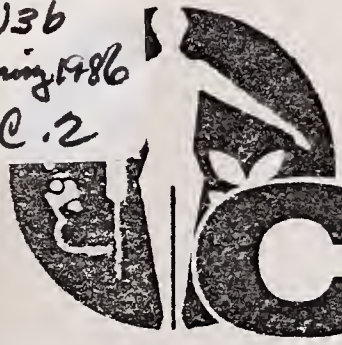


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Clearwater

SPRING 1986

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Treacherous Trenches:

The Death of Safety Awareness ?





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Do you have an interesting story or information you would like to see in this publication? Contributions of articles for the Big Sky Clearwater are gladly accepted. Please call or write to us at the address below.

If you do not wish to continue receiving this publication please send us your name and address so that we can remove your name from our mailing list.

Jan Cranor
Water Quality Bureau
Dept of Health & Env Sciences
Cogswell Building
Helena, MT 59620



The Big Sky Clearwater--for water and wastewater-treatment operators across Montana--is published two times a year by

the Water Quality Bureau of the State Department of Health and Environmental Sciences in cooperation with the Montana Section American Water Works Association and the Montana Water Pollution Control Association.



Publication dates: March 1 and August 1. Last date to receive contributions is 21 days before publication. Mail contributed material to Water Quality Bureau, Department of Health and Environmental Sciences, Room A206, Cogswell Building, Helena, Montana 59620

Trenching Accidents are Killers

By: Jan Cranor
Water Quality Bureau

Accidents do not just happen. They are a result of insufficient planning for specific conditions, lack of training or technical knowledge and inadequate safety awareness.

Excavating and trenching accidents are one of the killers in the water and wastewater industry. It is estimated that over one hundred fatalities and five thousand serious injuries occur each year in the United States from excavating and trenching cave-ins and related accidents. An excavation wall that is not properly shored or sloped can collapse in seconds burying workers, with little or no warning.

The scene on the cover shows a very hazardous working situation which, unfortunately, is more common than not. How many times have you heard an expression like: "I've been working in trenches for 20 years and never had anything bad happen," or how about "That bank will hold just fine, besides, it takes too much time to put shoring in." Those of you who attended the trenching safety seminar given by Ted Boyd for the Joint Education Committee or read the article in the Spring 1985 Big Sky Clearwater by Scott Anderson will recognize many of the hazards in this scene.

The most obvious hazard is the pipe slipping from its sling ready to fall on the worker below, however, the most dangerous potential hazard is from the walls of the trench collapsing. Hazards that should be avoided in a trenching job include the following:

- No personal protection (gloves, hard hat, goggles, boots, clothing).
- Inadequate escape ladder - should extend well beyond the top of the bank.

- Equipment too close to the edge - weight and vibration causes soil instability.

- Excavated material too close to the edge - should be at least 2 feet from the edge.

- Water entering and ponding in trench - adds to soil instability.

- Bank erosion and undercutting.

- Shoring extremely inadequate and in poor condition.

- Working under moving equipment.

- Children playing in excavation area.

Safety is an important consideration in the initial planning stages of a job. Adequate safety planning and equipment will add to the cost of a trenching project and is often of low priority because of the cost. The additional cost is insignificant, however, when compared to the cost of a job accident...or the loss of a life.

If you would like more information on safety in excavation and trenching or have any comments about the cover drawing, please contact Jan Cranor at the Water Quality Bureau.

Billings Has New Supervisory Control System

By: Joe Steiner
Billings Public Utilities Department

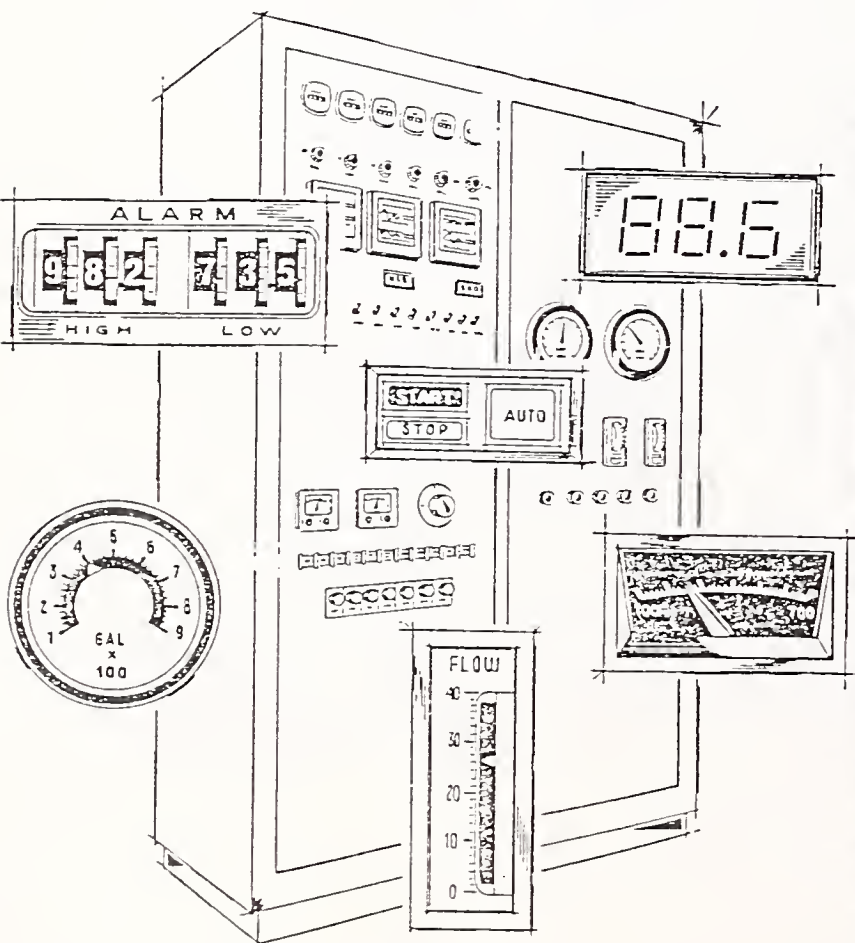
Faced with the need to expand an obsolete supervisory control system at the Billings Water Treatment Plant, the city chose to replace the existing system with a new Supervisory Control and Data Acquisition (SCADA) system.

It is a computer based telemetry system for monitoring and controlling water system processes. The computer system will interface with a radio telemetry system to communicate with 16 remote telemetry panels via radio traneivers.

The installation of the SCADA system will eliminate the obsolete supervisory control system and the expense and upkeep of the telephone lines to all the remote systems. It will be capable of various displays (i.e. graphic, tabular, message, custom, etc.), event logging, report generation, maintenance reporting and logging, pump control, system monitoring (i.e. flow reservoir level, pressure, etc.), in addition to innumerable other plant and system operations and management functions.

The equipment includes one microcomputer, two storage drives for data base backup and custom displays, 2 CRT's (cathode ray tubes) and keyboards, two loggers, one instrument panel, 15 remote terminal units and one test set (station simulator).

The system has been under construction contract for nearly a year and one half. To date, the hardware and software have been completed. The installation should begin near the middle of February with the project operational near the first of April 1986.



Historical Information Request

The Joint Historical Committee is looking for information, pictures and "antique" equipment for a display at the conference this year. If you can help, please contact Bob Haverfield, Historical Committee Chairman as soon as possible.

Bob Haverfield
City of Missoula
201 W. Spruce St.
Missoula, MT 59802
phone: 721-7448

Flathead Phosphorus Removal Activities Underway

By: Scott Anderson
Water Quality Bureau

Montana is about to enter a new era in wastewater treatment with the addition of phosphorus removal facilities in all treatment plants discharging into the Flathead Lake drainage basin.

The state of Montana recently imposed a 1 mg/l total phosphorus limit in an attempt to reduce the rate of eutrophication in Flathead Lake.

Increased algal production in the lake may be caused by an excess of nutrients coming from natural and man-related sources. Work by Jack Stanford at the Yellow Bay Biological Station shows that phosphorus is the nutrient limiting algal growth in Flathead Lake and that control of man-caused phosphorus will be effective in reducing water quality degradation. Chemically all of the phosphorus in wastewater is available for algal growth, whereas only portions of the phosphorus from natural sources can be used by algae.

Construction of new facilities for phosphorus removal should begin this summer at Columbia Falls, Bigfork and possibly Whitefish. In most cases modifications to the existing facilities will be adequate, although a complete treatment plant is needed at Bigfork. Recent permit modifications to the Kalispell Treatment Plant have sent the city's engineers back to the drawing boards to consider new facility requirements. Additional alternative analysis and design will not be completed in time to allow any construction at Kalispell this year.

The physical-chemical treatment process of adding alum followed by sedimentation (with filtration in some cases) is typically used to precipitate phosphorus in municipal wastewater treatment plants. While mechanical treatment plants can adapt readily to phosphorus removal, simpler systems such as the Whitefish aerated lagoons are not well-suited to incorporate nutrient removal by chemical addition. Whitefish is faced with adding new mechanical

facilities which will generate sludge as a by-product. Sludge handling and disposal could become a major operational requirement at the Whitefish System. Although sludge handling facilities now exist in the other three Flathead area treatment plants, the addition of alum for phosphorus removal could increase sludge quantities as much as 50 percent.

Financial assistance will be provided by the EPA Construction Grants Program to help pay the capital costs of the new treatment facilities. The annual operation and maintenance costs must be borne 100 percent by the users of the wastewater systems. Because the costs of chemicals and sludge handling could add a major expense to the municipalities' budget, local public officials are not accepting phosphorus removal without reservation. User rates will increase significantly.

Reducing the amount of phosphorus entering Flathead Lake is not restricted to municipal discharges. The Yellow Bay Biological Station is already successfully practicing phosphorus removal. Wastewater from the currently unsewered Lakeside area will be collected, treated, and disposed of by spray irrigation - a system designed to take up nutrients in plant growth. Other unsewered communities in the proximity of Kalispell, Whitefish and the shorelines of Flathead Lake are being evaluated to determine the fate of nutrients discharged from septic systems. Montana subdivision review requirements have been expanded to include nutrient removal for any new subdivisions located within 1/2 mile of any surface water. A ban on phosphorus in detergents has been proposed to reduce nutrient loads from septic systems to area ground waters. A phosphorus detergent ban will also benefit sewered communities by reducing the amount of chemicals needed at the wastewater treatment plant to precipitate phosphorus.

Sludge Comes to the Bitterroot

By: Tim Hunter
Superintendent
Hamilton Wastewater Treatment Plant

The Hamilton Wastewater Treatment Plant was completed in the spring of 1984. The plant is an oxidation ditch facility that uses screw pumps to lift the wastewater into the treatment works. The plant experiences extreme seasonal fluctuations in flow. Winter flows are about 500,000 gallons per day, and summer flows peak at about 2,500,000 gallons per day. The plant has produced excellent effluent since start-up, with BOD averaging about 6 mg/l and TSS about 10 mg/l. Operation has not been without problems however.

All newly constructed treatment facilities have mechanical and electrical problems during the "start-up" and "shake-down" period (about the first year of operation). The Hamilton facility had its share with the biggest problem being sludge. The two aerobic sludge digestors and sludge storage tanks were conservatively designed. The plant went into the first winter of operation with an empty sludge storage tank and there was little concern about running out of storage before spring when the drying beds could again be used.

The sludge began building faster than predicted in early winter. Toward the end of January, 1985 people began getting concerned. By mid-February facility personnel had to put some sludge out on the three remaining empty drying beds. Some thought the sludgicicles would never dry out, but that's another story. By spring the facility was in dire need of sludge storage and frequent supernating was the only recourse. This meant shutting the air off for more than 24 hours at a time, once a week. The sludge became difficult to stabilize and odor became a problem.

Luckily, last spring was one of the hottest and driest in history and the plant was able to keep ahead of the sludge, but just barely. But how was the storage tank ever going to be emptied before next winter?

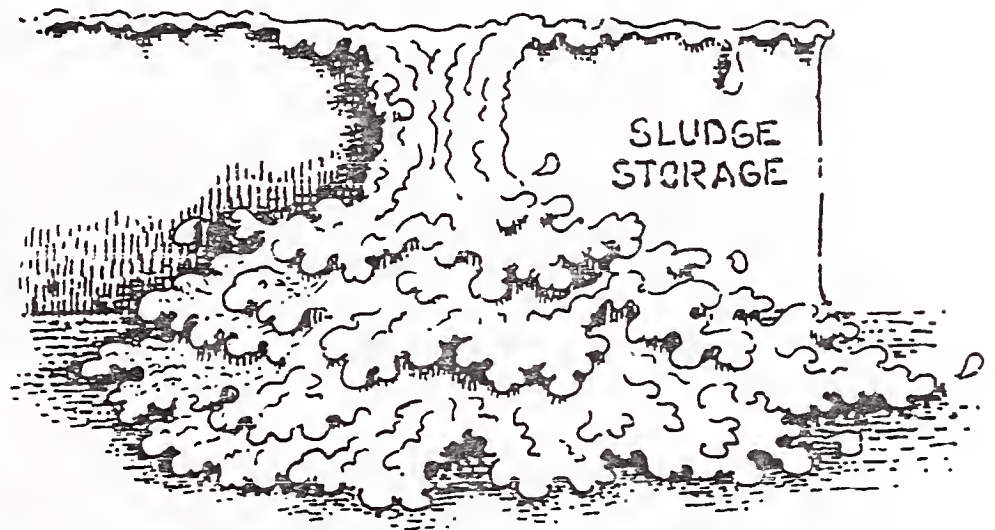
Wait a minute, where was all of this sludge coming from? The plant was designed to handle the sludge production from this small community with no problems. Hamilton has a creamery, but that was taken into consideration during design. No one wanted to pick on them anyway; they make such fantastic huckleberry ice cream. Still some began to wonder.

Facility personnel calculated the BOD loading over the first year of operation and found the plant was receiving about three times the load for which it was designed. Automatic samplers were borrowed from the City of Livingston (thanks John Sutherland, Mayor and Councilmen). They were set up ahead and behind the creamery discharge, and wow, what a load the plant was receiving. The creamery had been dumping undiluted whey with a BOD greater than 25,000 mg/l on a regular basis. Even without the whey discharge, it was making a significant contribution to the incoming BOD load. In fact, after two weeks of sampling the information revealed that 80 percent of the BOD load to the plant was being contributed by the creamery.

Several meetings with the creamery owner brought the BOD load down some but it did not seem to be significant enough. On August 5, 1985 the creamery notified the city it was going out of business. Then, tragically, that same evening, the creamery owner was killed in an automobile accident near Helena.

The weeks following the shutdown saw the wastewater treatment plant cutting back its wasting drastically. The digestors began to smell sweet again and things started looking rosy. (Editors comment: Tim has obviously had his "nose to the sludge" too long.) The city hired a local contractor to haul liquid sludge from the sludge storage tank to be spread on local agricultural land and Hamilton's sludge problems for now appear to be gone.

A recent article in a Hamilton newspaper tells about the possible re-opening of the creamery. Here we don't go again we hope?



Leaking Underground Tanks Polluting Groundwater

By: John L. Arrigo
Water Quality Bureau

New provisions in the federal law regulating hazardous wastes, the Resource Conservation and Recovery Act (RCRA), call for a program to control and prevent leaks from underground storage tanks. The new underground tank program will contain standards for new tanks, regulations concerning leak detection, prevention and corrective action, and requirements that owners of underground storage tanks notify the Department of Health and Environmental Sciences (DHES) of each tank's age, size, type, location and use.

The Environmental Protection Agency estimates there are from three to five million underground storage tanks in the United States that contain hazardous substances or petroleum products. An estimated 100,000 are presently leaking and another 350,000 are expected to leak within the next five years.

The DHES, Water Quality Bureau (WQB) has received nearly 75 complaints during the last three years that can be related to leaking underground fuel systems. This increase in reports of water pollution problems associated

with fuel leaks can be partially attributed to a rule in the relatively new (1982) Montana Groundwater Pollution Control System. Under ARM 16.20.1025, the owner, operator or person responsible for a spill or unanticipated discharge of any material that would lower the quality of ground water is required to report the leak to the DHES. The result of this rule is that state regulators are being informed of more leaks and spills.

The primary reason why pollution from leaking underground tanks is becoming prevalent appears to be that many more tanks are, in fact, leaking. Numerous underground tanks were installed during the 1940's and 1950's when corner gas stations were placed throughout suburbia. These tanks are now 30 to 40 years old and the corrosive subsurface environment has deteriorated, or in some cases disintegrated, the tanks. It is important to mention that tanks are not the only problem. Many leaks originate from buried pipes, pipe connections and pump systems. Leaks also occur at new installations when fuel storage and distribution systems are not installed properly.

The severity of environmental impacts caused by leaked petroleum products depends upon the volume of the leak, the character of subsurface materials, depth to ground water, and the nature of surrounding water and land uses. A large leak into a shallow, alluvial aquifer which is penetrated by nearby public water supply wells is obviously a worst case scenario that would require immediate investigation and corrective action. Irrespective of any regulatory program to control underground tanks, the discharge of a petroleum product, intentional or unintentional, to a location where it can cause pollution of state waters is a violation of the Montana Water Quality Act.

Assessment of the severity of environmental impacts from a leak requires detailed information. The party responsible for the leak is asked to provide data to the Water Quality Bureau so an evaluation of the problem can be made. Geotechnical studies which include the installation of monitoring wells and collection and analysis of ground water samples is often required to provide data for an accurate evaluation. The responsible party, or in some situations the party's insurance company, pays for the study.

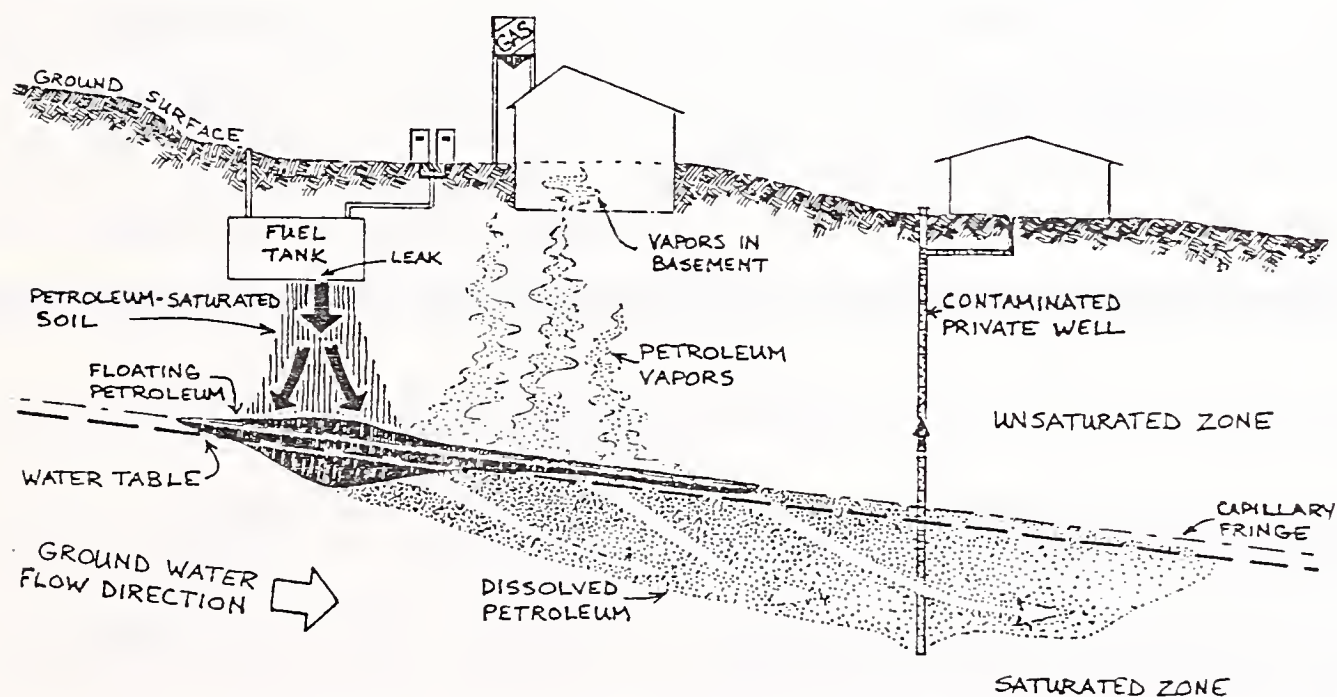
Investigations of ground water pollution are complicated and expensive. The behavior of petroleum hydrocarbons in the subsurface is not clearly understood. Initially as the petroleum migrates downward under gravitational forces it will adhere to soil grains in the unsaturated zone. Depending on the depth to water, the petroleum product will begin to accumulate and float on the water table as more product leaks. A portion of the hydrocarbons dissolve into the ground water and form a plume of contamination. Certain fractions of the petroleum contaminant volatilize or evaporate and are lost to the atmosphere. Fumes from underground fuel leaks can accumulate in basements, sewers or other confined areas and pose a significant fire and explosive hazard.

Corrective actions that can be implemented to reduce the impacts of a leak are generally site specific. The first concern is to stop the leak through replacement or repair of the faulty tank or pipe. Alternative water supplies must be provided to existing water uses disrupted by the leak. Treatment at the well head, connection to another nonpolluted source or installation of a new well are methods of providing a new supply. Recovery of petroleum floating on the water table through recovery wells is necessary where significant amounts of product have accumulated. Product recovery reduces the source of contamination and in some cases provides cost recovery. Nearly 500,000 gallons of useable diesel fuel have been recovered from a site in eastern Montana where railroad fueling operations spilled fuel over the years.

Processes to clean-up or contain petroleum contaminants that adhere to the soil or dissolve into ground water can be difficult and costly, and sometimes last for years. Excavation of contaminated soil is a simple remedy but if affected areas are large, removal and disposal costs quickly become prohibitive. Physical isolation or containment of the polluted soil and ground water can be achieved by installation of slurry trench cutoff walls, grout curtains, sheet piling or hydrodynamic controls. Again if the area of concern is large, the costs of these measures can be exorbitant. Contaminated ground water can be treated by aquifer rehabilitation techniques such as withdrawal and treatment of the water or in-situ treatment with enhanced biodegradation.

Remedial measures to correct ground water pollution problems caused by petroleum products leaking from underground fuel storage and distribution systems are typically very expensive and not always completely effective. It is far more cost effective to expend additional time and money up front for proper installation and regular monitoring and testing of the system to ensure that leaks are detected. Early detection is the key to limiting environmental damages caused by a petroleum product leak and subsequent costs of corrective measures.

Questions about this article or reports of leaking fuel systems should be directed to John Arrigo, DHES, WQB at 444-2406. Additional information on Montana's underground tank regulations can be obtained by contacting Larry Mitchell of the DHES Solid and Hazardous Waste Bureau at 444-2821.



JOB OPENING

Immediate Opening
Wastewater Plant Superintendent
Class 2-C Operator Certification Required

Contact: Lois Butcher
City of Chinook
P.O. Box 1177
Chinook, MT 59523

Calendar of Training Events

(through June 1986)

<u>Date</u>	<u>Topic</u>	<u>Location</u>	<u>Sponsor</u>
Feb 13	Water Conservation Cross Connections	Shelby	MRWS
Feb 18	Basic Hydraulics and Troubleshooting Centrifugal Pumps	Glendive	AWWA/WPCA
Feb. 19	Basic Hydraulics and Troubleshooting Centrifugal Pumps	Wolf Point	AWWA/WPCA
Feb 20	Basic Hydraulics and Troubleshooting Centrifugal Pumps	Havre	AWWA/WPCA
Feb 24	Basic Hydraulics and Troubleshooting Centrifugal Pumps	Missoula	AWWA/WPCA
Feb 25	Basic Hydraulics and Troubleshooting Centrifugal Pumps	Great Falls	AWWA/WPCA
Feb 25	Operator Certification Review	Kalispell	WQB/MRWS
Feb 27	Operator Certification Review	Missoula	WQB/MRWS
Feb 27	Basic Hydraulics and Troubleshooting Centrifugal Pumps	Billings	AWWA/WPCA
March 13	Operator Certification Review	Great Falls	WQB/MRWS
Mar 19-21	Annual AWWA/WPCA Conference	Billings	AWWA/WPCA
Apr 15	Chlorination Safety and Equipment Repairs	Kalispell	MRWS
Apr 17	Chlorination Safety and Equipment Repairs	Missoula	MRWS
Apr*	Process Control for Biological Treatment Plants-Activated Sludge, Oxidation Ponds, RBC and ABF	Helena	AWWA/WPCA
May 15	Water System Basics	West Glacier	MRWS
May 22	Leak Detection and Water Conservation	Lewistown	MRWS
May*	Maintenance of Collections Systems	Great Falls Missoula Billings	AWWA/WPCA
June* (9-13)	Introduction to Microcomputers	Havre, NMC	AWWA/WPCA
June 18	Chlorination Safety and Equipment Repairs	Wolf Point	MRWS

* Specific dates have not been set

Seminar notices, including all pertinent information, will be mailed approximately one month prior to the AWWA/WPCA seminars and about two weeks prior to the WQB/MRWS seminars.

More information can be obtained by contacting the following persons:

Denise Ingman
Water Quality Bureau
A206 Cogswell Building
Helena, MT 59620
444-2406

Ray Wadsworth
MRWS
1824 10th Ave. S; Suite 4B
Great Falls, MT 59405
454-1151

Kristi Kline
AWWA/WPCA
Box 231
Havre, MT 59501
265-9031

Operator Training

The Water Quality Bureau, Northern Montana College, the Joint Education Committee of AWWA-WPCA and Montana Rural Water Systems along with various other individuals or groups are involved in operator training in Montana. We need your input as to the type of training you would like to see provided by these groups. Please contact Denise Ingman or Jan Cranor at the Water Quality Bureau with any ideas you have. Our goal in the next year is to make training more available and beneficial in Montana. We need your help to accomplish this goal.

DO YOU WANT EDUCATIONAL INFORMATION SENT TO YOU?

State law prohibits DHES from giving out the name of an individual to anyone who wants to send educational materials or, in many cases, notices of seminars and other training opportunities, UNLESS the person gives DHES permission to release the name. If you want to receive education and training information from sources outside of state government, please sign and clip the coupon below and send it back to: Jan Cranor, Water Quality Bureau, Department of Health and Environmental Sciences, Capitol Station, Helena, Montana 59620.

I give the Department of Health and Environmental Sciences permission to release my name and address to any individual or organization for the purpose of sending me educational and/or training materials relevant to the water and wastewater industry. This permission will remain valid until I notify DHES in writing that I am withdrawing it.

Name: _____

Address: _____

Date: _____

CEU Rule Proposed

The Montana Water and Wastewater Operator's Advisory Council has submitted the following suggested continuing education regulation to the Department of Health and Environmental Sciences (DHES) for addition to the rules establishing requirements for renewal of certification. The DHES' legal staff will further refine this proposal before it is officially submitted to the public for their review and comment. Those wishing to receive a copy of the department's proposed regulation and/or to make comments are asked to call Rosemary Fossum, 444-2691, or Don Willems, 444-3948, or to write:

Operator Certification Section
Water Quality Bureau
Department of Health & Env. Sciences
Cogswell Building
Helena, MT 59620

A concerted effort on training by the DHES, Montana Section of American Water Works Association, Montana Water Pollution Control Association, Montana Rural Water Systems, Inc., Montana State University, Northern Montana College, operators and others will be needed to make a CEU program work.

Continuing education units (CEUs)

(1) CEUs must be earned during two-year periods beginning on July 1, 1986, and July 1 of even numbered years thereafter for all Class I, II, III, and IV fully certified operators. A Class I certified operator must earn one unit or ten contact hours per certificate during each two-year period. Class II, III or IV certified operators must earn one-half unit or five contact hours per certificate during each two-year period until 1992. After July 1, 1992, the units required for each classification shall be doubled. Newly certified operators (previously uncertified) who become certified after April 1 of a two-year period will not be required to earn CEUs until the next two-year period. If an operator upgrades a certificate after April 1 of a two-year period and that upgrade increases the CEU requirement, the operator will not be required to meet the higher CEU

requirement until the next two-year period but must earn the lower CEU value for that period.

(2) Beginning July 1, 1988 and succeeding even-numbered years, only those operators fulfilling the CEU requirements before the end of each two-year period will be allowed to renew their certificate(s). The certificate(s) of operators not fulfilling the CEU requirements shall expire on June 30 of the applicable biennium and may only be reissued on passage of the appropriate examination(s).

(3) All activities for which CEU credit will be granted must be approved by the department and must be related to the subject matter of the particular certificate to which the credit is being applied.

(4) The department may, in individual cases involving hardship or extenuating circumstances, grant an extension of time of up to one year within which to fulfill the minimum CEU requirements. Hardship or extenuating circumstances include documented health-related confinement or other circumstances beyond the control of the certified operator which prevent attendance at the required activities. All requests for extensions must be made prior to March 31 of each biennium.

(5) It is the certified operator's responsibility to notify the department of the CEU credit earned during the period. The CEU credits earned during the period shall be shown on the application for renewal.

(6) A certified operator shall be deemed to have complied with the CEU requirements of this rule during periods that the operator serves honorably on active duty in the military services, or for periods that the operator is a resident of another state or district having a CEU requirement for operators and meets all the requirements of that state or district for practice there, or for periods that the person is a government employee working as an operator and assigned to duty outside of the United States, or for other periods of active practice and absence from the state approved by the department.

Examination Notice

ON SATURDAY-----MARCH 15, 1986-----9:30 A.M.

examinations for certification as a Water Distribution System Operator, Water Treatment Plant Operator, and Wastewater Plant Operator will be given at these eight locations:

BILLINGS-----in the Gallatin Room, Student Union Building, Eastern Montana College

BUTTE-----in Room 108 of the Mining and Geology Building at Montana Tech

GREAT FALLS----in Room S119 of the Science Amphitheater, College of Great Falls

HAVRE-----in Room 103-4 of the Math/Science Building at Northern Montana College

HELENA-----in Room A110, Cogswell Building (east side, driveway entrance)

KALISPELL-----in Room 35, Montana Hall, Flathead Valley Community College, 15 First St. E.

MILES CITY-----in Room 113, Miles Community College, 2715 Dickinson

MISSOULA-----in Room 102, Liberal Arts Building, University of Montana

By March 3, as required by ARM 16.18.204, everyone taking examinations must have:

--completed an application for certification as a water/wastewater operator.

--paid appropriate application (or renewal) fees for fiscal year 86 which ends 6/30/86..

--submitted examination registration slips and fees of \$5 per examination.

APPLICATION FEES ARE: Class 1-\$27; Class 2-\$22; Class 3-\$17; Class 4-\$12; Class 5-\$10
To request application materials, order study materials, or ask for additional information,
call the certification office at 444-2691 or write: DHES - WATER QUALITY BUREAU; Water
and Wastewater Operator Certification; Room A206, Cogswell Building, Helena, MT. 59620

~~PLEASE RETAIN THE UPPER PORTION OF THIS NOTICE. NO ADDITIONAL NOTICE WILL BE SENT TO YOU.~~

EXAMINATION REGISTRATION SLIP

(Detach and return with \$5 per examination by March 3, 1986)

I will take the examination(s) I have checked below at:

	_____ Billings	_____ Butte			
_____ Great Falls	_____ Havre	_____ Helena	_____ Kalispell	_____ Miles City	_____ Missoula
	1	2	3	4	5
A--Water Distribution	_____	_____	* _____	* _____	
B--Water Treatment	_____	_____	_____	* _____	5AB _____
C--Wastewater	_____	_____	_____	_____	

*Combination examinations 2A3B, 3A4B, 4A4B, and 5A5B require \$5 exam fee remittance only.

[illegible]

Certification Corner

1. All chlorine cylinders are required to contain a fusible metal safety device designed to melt between 158°F and 165°F. True or false.
2. State regulations require that ceiling exhaust fans be installed in chlorinator rooms. True or false.
3. What special safety precautions should be taken when handling hypochlorites?
4. What is the primary purpose of a fuse or circuit breaker?
5. Why should treatment chemicals, either liquid or dry, never be mixed together for purposes of water treatment?

Answers

1. True - this safety device releases the container's contents and prevents the cylinder from exploding in the event of fire or excessive heat.
2. False - Since chlorine is heavier than air it will sink to the floor of the chlorinator room. For this reason, the exhaust fan must be located near the floor.
3. The corrosive nature of hypochlorites dictates the use of corrosion-resistant material for handling and dispensing hypochlorites. Also, persons involved in these operations should wear protective apparel such as rubber gloves, apron, and goggles. In addition, splashing from the container should be carefully avoided. If splashing occurs, all exposed areas should be washed with large volumes of water.
4. The main purpose of a fuse or circuit breaker is to prevent electrical accidents or tragedies. It functions by burning out or disconnecting the breaker switch before serious damage can occur such as a fire, electrocution or damage to electrical equipment.
5. Combining chemicals is usually uneconomical, complicates the proportioning process and can be dangerous. Also, the same feeding equipment or dust-collecting systems should not be used for more than a single chemical unless the apparatus is properly cleaned after use of each chemical.

On the Trail of Giardia Lamblia

By: Donna Howell
Giardia Consultant

The Water Quality Bureau (WQB) has recently initiated a special project to examine public water systems for Giardia. The presence of Giardia in Montana shouldn't be a surprise to any water treatment operators or health officials. It has plagued backpackers and hikers using our national forests and parks, caused outbreaks in public water systems and been detected in some surface waters which serve as drinking water supplies.

Giardia inhabits the small intestine of humans and other animals, and causes symptoms such as diarrhea, weakness, weight loss, nausea and abdominal cramping. It is transmitted by an individual ingesting the cyst, or dormant stage of the organism. It has become the most commonly detected cause of waterborne gastroenteritis in the United States. Cysts occur in water when infected animals excrete fecal material into lakes and streams. Several million cysts may be released at once, as few as 10 are able to cause an infection in humans. Because Giardia cysts are resistant to chlorine at low temperatures and have been found in drinking water which otherwise meets coliform and turbidity requirements, the WQB is taking a closer look at the state-wide potential for Giardia problems.

For those not familiar with the project, each public water supply is to be evaluated for the presence of Giardia, and the potential for cysts to pass through the treatment plant. This evaluation will compile information on effective filtration practices, while pinpointing areas requiring special attention. Those systems found to have inadequate treatment for removing cysts will receive operational assistance or recommendations on improving their facilities and be expected to obtain the appropriate compliance levels. As this

project is implemented, sampling apparatus will continue to be available through the WQB for systems wishing to have their water examined for Giardia outside of the scheduled visits.

During the visits to each municipality, a presentation and question/answer session on Giardia will be provided to operators, local officials, health nurses and any other interested individuals. Topics covered include the lifecycle, current developments in filtration practices and methods for individual protection from infection. Public seminars on the parasite also may be scheduled for other groups upon request.

Since its implementation last October, this project has received much more cooperation and a warmer welcome from Montana's water treatment operators than it has from Mother Nature. Weather permitting, I should be able to reach most of your facilities by late spring. The success of these evaluations will be measured through the achievement of a greater appreciation for effective filtration practices, an increased public awareness of water quality concerns and the eventual elimination of the Giardia threat from Montana's water supplies. We are optimistic that all of these goals can be achieved to the benefit of your municipalities and the assurance of the safety of Montana's drinking water systems.

For assistance or requests for special seminars, write: Montana Water Quality Bureau, Attn: Safe Drinking Water Section, Cogswell Building, Capital Station, Helena, MT 59620 or call 444-2406.

Giardiasis Gives Red Lodge New Water Treatment

By: Robert Kruse
Plant Superintendent

The City of Red Lodge, Montana encountered an epidemic of giardiasis during the summer of 1980. The epidemic affected 860 people in Red Lodge, a community with a total population of 1896.

The Red Lodge water treatment process at the time of the epidemic incorporated only disinfection of the water received from the West Fork of Rock Creek. Disinfection was accomplished through continuous flow chlorination. Thus, variations in flow caused variations in chlorination dosage. Immediately following the outbreak of giardiasis in Red Lodge, a proportional chlorination feed system was installed at the water distribution headworks. Also, a "Boil Order" was issued by the county sanitarian. The "Boil Order" was issued based upon research which indicates that chlorination alone may not provide complete "kill" of Giardia lamblia cysts.

In order to provide the City of Red Lodge with a double barrier defense against Giardia lamblia entering the city's water supply system, a water filtration system was installed. This filtration plant was placed into operation in the spring of 1984. The filtration system uses a static mixer for rapid mixing, contact flocculation, direct filtration and disinfection. Chemicals are added at the static mixer. Plant experience has shown that different chemicals are used seasonally.

During the summer months, soda ash is added to maintain an effluent pH of 6.8, the alum dosage averages 7.0 mg/l, and the anionic polymer dosage is about 0.5 mg/l. In the winter bentonite is added to increase the raw water turbidity to 1.0 NTU or greater. The bentonite provides sufficient material in the water to allow the coagulation and flocculation reactions to occur. Following bentonite, the winter alum dosage averages 2.5 mg/l with anionic polymer dosages of 0.5 mg/l. The effluent pH during winter months averages 7.1.

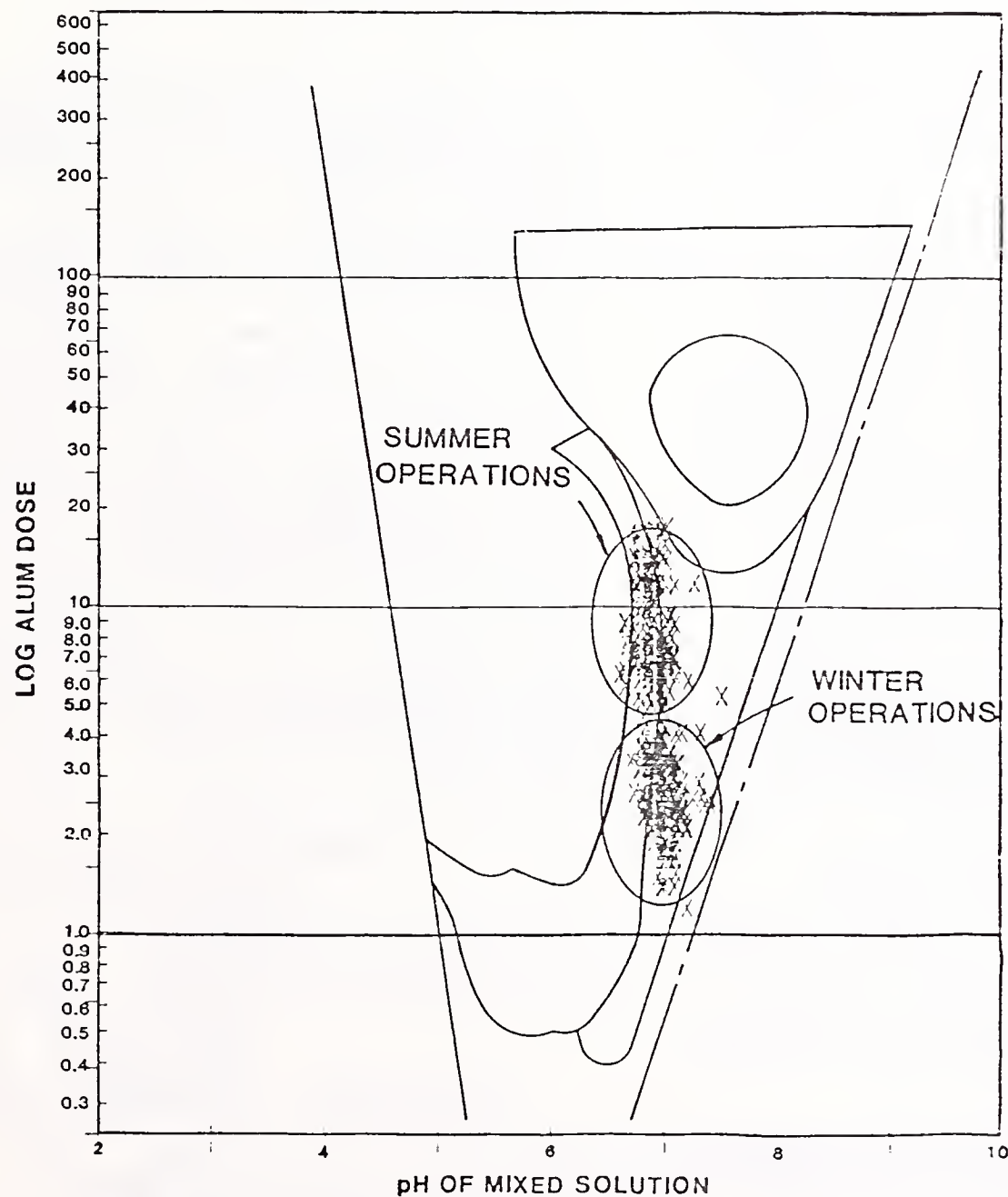
The effluent water turbidity averages 0.05 NTU consistently throughout the year. The plant was designed to produce less than 0.1 NTU effluent turbidity. Turbidity is used as a surrogate test for Giardia removal. Studies from Colorado State University have confirmed that turbidity removals correlate very well with Giardia removals. Since the Red Lodge Water Treatment Plant has been started up, no new cases of giardiasis have been related to the water system.

The operating diagram for alum coagulation published by Dr. A. Amirtharajah, Montana State University, is a key tool used in the process control of the Red Lodge Water Treatment Plant. The diagram with the Red Lodge operating data plotted shows the two operating positions of the water treatment plant. In the summer, the water plant operates most efficiently in the adsorption-destabilization region, while in the winter operation is in the combined (sweep and adsorption) region. Daily use of the operating diagram for alum coagulation allows operators to understand the concepts needed to control the water treatment process.

Operators, by virtue of their position, are placed in an unusual predicament. Process facilities, such as a water treatment plant, are designed, in part on theory. It is then the job of the operator to make the theory work in "real life." To do this, an operator must become familiar with the plant design theory. The only way which an operator can accomplish this task is to devote some of his personal time in reviewing the various manuals and journals, such as those published by the American Water Works Association. Also, an operator cannot be afraid to ask questions and experiment. The old phrase "the only dumb question is the question never asked" must become part of his philosophy. The questions can be answered by various sources of information, but one key source of answers is the design engineer. Answers may also be obtained from discussions with the Water Quality Bureau, the Engineering Department at MSU, or reading material published on the subject of concern.

RED LODGE WATER TREATMENT PLANT

EFFLUENT TURBIDITIES LESS THAN 0.1



Keeping Giardia in Hot Water

By: Donna Howell
Giardia Consultant

A recent study has shown that heating water to at least 131 degrees F (Fahrenheit) will kill the cysts of Giardia lamblia immediately. Also, the parasite is unable to survive for 30 minutes in 59 degree water treated with iodine.

To place these temperatures in perspective, water boils at 212 degrees at sea level, an average stream may run at 33 to 45 degrees, and room temperature is usually 65 to 70 degrees. It has previously been believed that boiling was required to kill waterborne cysts and the effectiveness of iodine treatment was not well defined.

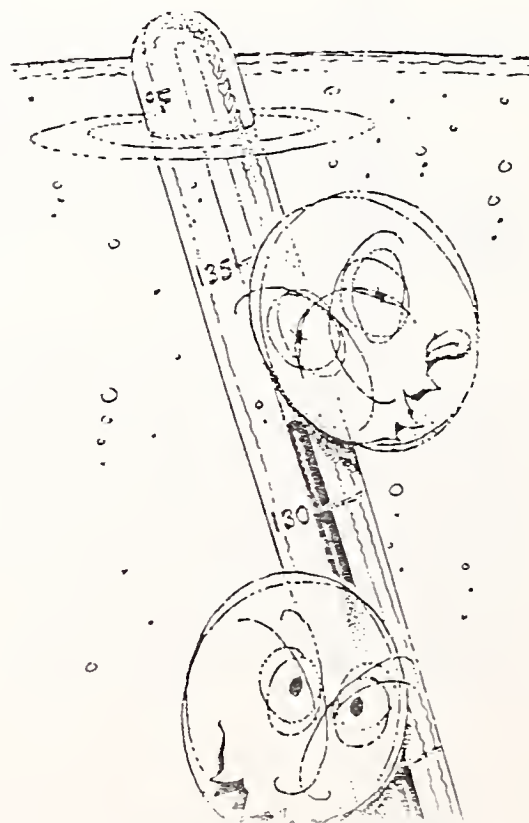
This research, conducted at Colorado State University by Robert Aukerman, professor of recreational resources, and Don Monzingo, doctor of parasitology, was intended to simulate conditions encountered when backpacking in cold weather. Heat treatments were evaluated by bringing cold water which contained infective cysts up to the appropriate temperature, cooling the solution in ice water and immediately checking the cyst viability. Treatment of the water with iodine was performed using tetraglycine hydroperiodide (TGHP), according to the product instructions and at different temperatures. TGHP is the active ingredient in several commercially available iodine tablets. These methods determined cyst survival after the heat or chemical treatment by their ability to cause Giardia infections in specially reared gerbils (small rodents).

When relying on temperature to kill Giardia, these researchers stress the importance of using a high quality thermometer to make accurate temperature measurements. Accuracy in the readings is important because cysts were not killed when heated to 122 degrees, only 9 degrees below the level which was

effective. Iodine was effective when added as one tablet per quart of water after 30 minutes at 59 degrees and after 15 minutes at 68 degrees. The iodine tablets were not effective after 15 minutes at 34 or 50 degrees.

Adjustments in dose must be made for turbid water as directed on the product labels. The authors also emphasize following the manufacturers instructions on iodine use and storage to avoid using old or ineffective tablets.

The Department of Health and Environmental Sciences warns that these tests were performed on Giardia alone and are not expected to eliminate the threat of viral or bacterial contaminants in a water system. For this reason the current 5 minute boiling period for systems on a health advisory will not be changed. Also, for those not inclined to tote and care for a thermometer in the wilds, bringing the water to a boil will ensure protection against Giardia infection. Dr. Monzingo expressed a similar opinion and said that the research was intended to provide some guidelines for backpackers and campers and the option to boil or not to boil should remain an individual decision.



MSAWWA-MWPCA Conference in Billings

Spring could not be brought in better than through attendance at the annual MSAWWA/MWPCA conference in Billings on March 19, 20 and 21. The conference offers water and wastewater officials the opportunity to participate in technical sessions, visit manufacturer/supplier displays and engage in innumerable discussions pertinent to water or wastewater. The technical program provides a unique mix of subjects from water rights litigation to acid rain.

The conference is being held at the Sheraton Hotel in downtown Billings (406/252-7400). The hotel is offering a special room rate of \$38.00 per night for a single room and \$44.00 per night for a double room. Please mention you are attending the MSAWWA/MWPCA 1986 Joint Conference to receive the rate. Reservations must be received by March 5, 1986 to insure accommodations.

PROGRAM

Wednesday, March 19, 1986

1:00 - 5:00 p.m. Registration Open at Hotel
1:00 - 7:00 p.m. Exhibit Areas Open

Tours of the water or wastewater treatment plants can be arranged with prior notice.

Thursday, March 20, 1986

8:00 a.m. Registration
8:30 a.m. Call to Order
9:00 a.m. Business Meeting
9:45 a.m. Break

Joint Session

10:00 a.m. High School Debate - National Water Policy
11:00 a.m. Silver Bow Creek - From Mining Legacy to Superfund Site
12:00 lunch WPCF Report and Certification Update

Joint Session

1:30 p.m. Our Water and Our Future
2:15 p.m. Liability Insurance Crisis
3:00 p.m. Break

Concurrent Sessions - Wastewater

3:15 p.m. Geotechnical Considerations in Locating, Designing and
Constructing Wastewater Ponds
4:00 p.m. Equipment for Collection System Maintenance

Concurrent Sessions - Water

- 3:15 p.m. Giardia Lamblia: Current Removal Technologies
4:00 p.m. Giardia Source Investigation in a Municipal Watershed

Friday, March 21, 1986

Concurrent Sessions - Wastewater

- 8:30 a.m. Process Control - Operators Approach to Mass Balance'
9:15 a.m. Sludge Utilization - Helena On-site findings
10:15 a.m. Break
10:30 a.m. Sludge Processing Alternatives - Design and Operation
11:30 a.m. Lunch

Concurrent Sessions - Water

- 8:30 a.m. Geohydrology - Optimizing Efficiency and Yield
9:15 a.m. Ozone - Treatment Technology
10:15 a.m. Break
10:30 a.m. Water Treatment - Filters, Fluidized Beds and Backwashing
11:30 a.m. Lunch - AWWA Report

Joint Session

- 1:00 p.m. National Acid Deposition Research - A Western Perspective
2:00 p.m. Public Crisis Communication
3:00 p.m. Business Meeting

5:00 p.m. Adjourn

There will be a special program for the spouses, however the agenda has not been developed yet.

FOR SALE

1 YSI Model 54 ARC Dissolved Oxygen Meter with new BOD Probe, new Submersible Probe on 10 foot cable, and 2 Probe Service Kits. Sells new for \$1344. Priced at \$650.

1 Corning Model 5 Analog pH Meter with general purpose reference electrode. Sells new for \$663. Priced at \$350.

450 EnviroQuip Snap-cap Diffusers with 3/4" NPT base. Sell for \$6.60 each, Priced at \$3.00 each.

Contact:

Mark L. Richardson, Superintendent
Miles City Wastewater Treatment Plant
Drawer 910
Miles City, MT 59301
(406)232-0715

TO GIVE AWAY:

Aluminum Sulfate: 24-50# bags. Free if you pick up or pay shipping. Call Pete Schendel at Canyon Ferry, Helena for making arrangements 475-3310.

Advance Registration Application
Annual Joint Conference of MSAWWA and MWPCA
March 19, 20 & 21, 1986
Sheraton Hotel
27 North 27th
Billings, MT

Mail To: 1986 MSAWWA/MWPCA Conference
c/o Public Utilities Department
P.O. Box 30958
Billings, MT 59111

\$75.00 _____ General Registration - Member
\$85.00 _____ General Registration - Non Member
\$40.00 _____ Student/Life Member Registration
\$40.00 _____ One Day Registration
\$40.00 _____ Spouses Registration

(Registration includes access to technical sessions, manufacturer displays, two luncheons, get acquainted dinner (Thursday) and Awards/Dinner-Dance (Friday)).

Enclosed please find a check, money-order, or warrant payable to: 1986 MSAWWA/MWPCA Conference. Amount enclosed \$ _____.

NAME: _____

UTILITY, COMPANY, CITY, COUNTY: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

IF ATTENDING: SPOUSE'S NAME: _____

_____ MEMBER AWWA _____ MEMBER MWPCA _____ NON MEMBER

Expand Your Water Horizons

If you're involved in any way with the water industry, then membership in AWWA is for you! In the past century, AWWA has blossomed into the largest international scientific and educational society dedicated to improving drinking water. As a member you will become better prepared to face the challenges of tomorrow for yourself, your industry and your community.

OPERATORS! It all began with you. You can join AWWA as an affiliate member for only \$19.00 per year.

Affiliate membership is exclusively for personnel of water utilities with fewer than 1000 services or for employees in a non-supervisory position in any utility. Annual dues are \$19.00

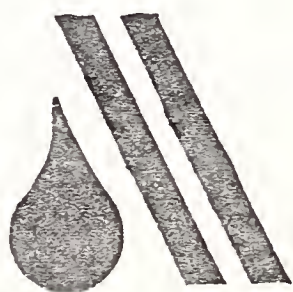
*Affiliates do not receive the AWWA Journal.

Active membership is for water utility personnel, municipal officials, consultants, educators, etc. Annual dues are \$48.00.

Student membership is for enrolled college students. Annual dues are \$15.00.

For more information or if you need just a little more prodding contact:

Denise Ingman
A206, Cogswell Building
Helena, MT 59620
444-2406



The following are some of the services and benefits membership in AWWA brings you:

JOURNAL AWWA, the world's most valuable source of technical and management water supply data.*

MAINSTREAM, a monthly news publication packed with important features and news stories about activities and achievements of Association members throughout the world.

OPFLOW, the widely acclaimed and highly readable monthly publication that provides operators with ideas, services and useful how-to information.

TECHNICAL LIBRARY, a computerized data center that provides immediate access to worldwide sources of information on the water supply industry.

Education opportunities, including regularly scheduled seminars and workshops, education services and specially packaged education programs.

Group Insurance eligibility.

Low member rates on all AWWA standards, manuals, handbooks and other fine publications.

Free employment listings in Mainstream.

Free Membership in the AWWA section where you live or work, with opportunities to participate in all section activities.

10-35% Avis car rental discount.

Access to WATERNET, AWWA's data base of information about water supply and water treatment technology.

*Not to affiliate members.

Join AWWA Today.

Do yourself and your career a favor by joining the American Water Works Association. Membership in AWWA provides you with a wealth of knowledge on the most up-to-date information in the water supply industry. AWWA addresses current and relevant problems and practicalities of the water supply field. You can be informed and in-the-know when you join the team of professionals who belong to AWWA.

Become a member of AWWA. Just fill out the application and mail it to AWWA, c/o Denise Ingman, Water Quality Bureau, Department of Health and Environmental Sciences, Cogswell Building, Helena, Montana 59620

AWWA INDIVIDUAL MEMBERSHIP APPLICATION

AWWA USE ONLY

⑧

CHECK TYPE OF MEMBERSHIP

- | | Grade Code | Annual Dues |
|---------------------------------------------------------------------------------------------------------------|------------|-------------|
| <input type="checkbox"/> Active | 02 | \$48.00 |
| <input type="checkbox"/> Affiliate
(Strictly for operator-level personnel or employees of small utilities) | 06 | \$19.00 |
| <input type="checkbox"/> Student
(Must be enrolled and carrying at least 10 credit hours) | 14 | \$15.00 |

IMPORTANT

Affiliate applicants give number of customers your utility serves _____

LAST NAME Please print _____ FIRST NAME (and middle initial) _____

MAILING ADDRESS _____

CITY _____ STATE OR PROVINCE _____ ZIP _____

AREA CODE _____ TELEPHONE _____

TITLE _____

EMPLOYER'S NAME (IF NOT ALREADY IN MAILING ADDRESS) _____

APPLICANT'S SIGNATURE _____ DATE _____

SIGNATURE OF AWWA MEMBER ENDORSING APPLICATION _____ ENDORSER MEMBER NUMBER _____

PRINT LAST NAME OF ENDORSING MEMBER _____

ALL APPLICANTS COMPLETE THIS SECTION:

Circle the descriptions below that best describe YOU. The information is used in surveys of AWWA readership. Circle ONLY one in each group.

1 BUSINESS AND INDUSTRY

- A Public Water Supply Utility—Municipally Owned
- B Public Water Supply Utility—Investor Owned
- C Governmental—Federal State Local
- D Consultant
- E Contractor
- F Private Industrial Systems or Water Wholesaler
- G Manufacturer of Equipment & Supplies including Representatives
- H Distributors of Equipment & Supplies including Representatives
- I Educational Institutions Faculty and Students Libraries and Other Related Organizations
- J Fully Retired
- K Research Labs

2 JOB TITLE

- A Executive—Gen'l Mgr. Commissioner Board Member City Mgr. Mayor President, Vice President Owner Partner Director etc
- B Management—Division Head Section Head Dept Head Mgr. Chief Engineer Comptroller etc
- C Engineering non-managenal—Civil Engr. Mech. Engr. Envir. Engr. Planning Mgr. Field Engr. Systems Designer etc
- D Scientific non-managenal—Chemist Biologist Biophysicist Researcher Analyst etc
- E Purchasing—Purchasing Agent Procurement Specialist Buyer etc
- F Operations—Foreman Operator Maintenance Crewman Service Rep. etc
- G Marketing & Sales non-managenal—Mkt. Analyst Mkt. Rep. Salesman Sales Rep. etc
- H Other describe _____

3 CHECK FIELD(S) SERVED

- 5 ☐ Water Supply Only
- 7 ☐ Wastewater Only
- 9 ☐ Both
- 3 ☐ Other

In some AWWA sections a portion of the section allotment equal to 50 percent or more of the domestic subscription rate charged for the section periodical will be allocated toward a subscription to that periodical

PREPAYMENT OF ONE YEAR'S DUES REQUIRED:

1. If you ask to be billed, you will be billed. No other action on your application can be taken until payment is received.
2. An acknowledgment will be mailed to you. If you haven't heard from AWWA in one month
 - a. contact your section's Secretary or Membership Committee Chairman. The application may have been held up there inadvertently
 - b. contact AWWA in Denver with an inquiry

- ☐ Check Enclosed
- ☐ Please send bill to

- Charge to my
- ☐ MasterCard
- ☐ Visa
- Card No _____

Dues allocated for each publication members receive: Journal \$20 • Mainstream \$5 • Opflow \$5 • Research Foundation \$3 •

Contacts for Water Quality Bureau

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

WATER QUALITY BUREAU

The following identifies some of the contacts that can be utilized when faced with planning, designing, constructing or operating water and wastewater systems:

BUREAU CHIEF - Steven L. Pilcher - 444-2406

WATER SUPPLY - Treatment, Storage, Distribution, Chlorination, Plans and Specifications Review, Guardia, Rules and Regulations

Dan Fraser, Section Head - 444-2406
Jim Melstad - 444-2406
Rick Rosa - 444-2406
Roy Wells - 444-2406
Jerry Burns (Billings) - 252-5697
Kathy Miller (Billings) - 252-5697

MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES) - Monitoring Requirements, Permit Acquisition, Compliance Monitoring

Fred Shewman, Section Head - 444-2406
Mike Pasichnyk - 444-2406
Dick Pedersen - 444-2406

CONSTRUCTION GRANTS - EPA Wastewater Treatment Grants, Wastewater Treatment Plant Design and Construction, Collection System Design and Construction

Scott Anderson, Section Head - 444-2406
Craig Brawner - 444-2406
Diane Davison - 444-2406
Randy Nelson - 444-2406
Sanna Yost - 444-2406

GENERAL WATER AND WASTEWATER PLANNING AND DESIGN - Design Standards, Plans and Specifications Review, Stormwater Requirements, Septic Tanks, Wastewater Disposal

Dan Fraser - 444-2406
Scott Anderson - 444-2406
Roy Wells - 444-2406
Jerry Burns (Billings) - 252-5697

OPERATION AND MAINTENANCE ASSISTANCE - Treatment Plant Operation Assistance, Training

Wastewater - Jan Cranor - 444-2406
Water - Denise Ingman - 444-2406

OPERATOR CERTIFICATION - Rules and Regulations, Examination Schedule and Review, Training Assistance

Rosemary Fossum - 444-2691
Jan Cranor - 444-2406
Denise Ingman - 444-2406

SUBDIVISIONS - Rules, Regulations, Plan and Specification Review, Sanitary Restriction Removal

Jim McCauley - 444-2406
Joe Strasko - 444-2406
Michele Wityk - 444-2406

WATER QUALITY MANAGEMENT - Water Quality Standards, Stream Monitoring, EIS Review, Special Studies

Loren Bahls - 444-2406
Abe Horpestad - 444-2406

HELENA OFFICE

Montana Department of Health
and Environmental Sciences
Water Quality Bureau
Cogswell Building, Room A-206
Helena, Montana 59620
Phone: (406) 444-2406

BILLINGS OFFICE

Montana Department of Health
and Environmental Sciences
Water Quality Bureau
P.O. Box 20296
(3302 Second Avenue North)
Billings, Montana 59104-0296
Phone: (406) 252-5697

Heiser Retires

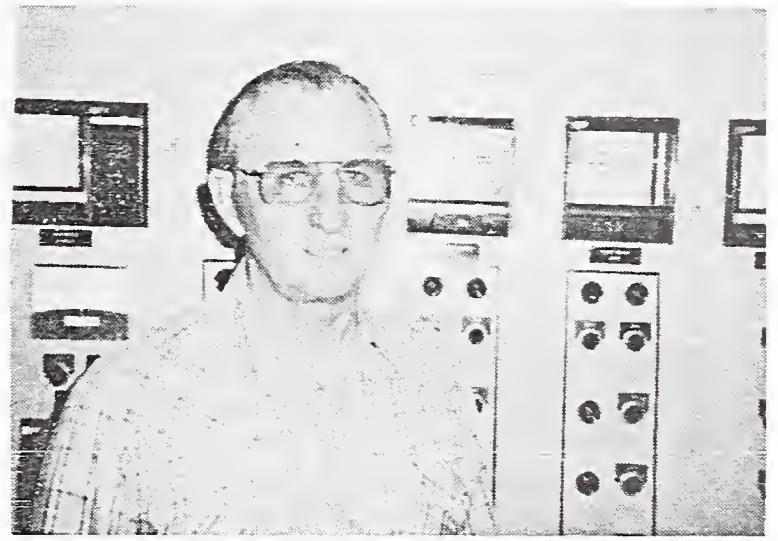
Operator Profile

By: Joe Steiner
Billings Public Utilities
Department

After nearly 24 years of service in the City of Billings' Public Utilities Department (PUD), Buford "Bud" Heiser retired on December 31, 1985.

Bud began work in the Utilities Department as a laborer for the water distribution crew and worked his way to assistant superintendent of the Water Plant, the position he held when he retired. Bud held numerous supervisory positions in both the wastewater and water treatment plants.

Throughout Bud's tenure, the treatment facilities were constantly under construction. The water treatment plant filtering capacity was increased from 26 MGD to 111 MGD, the wastewater treatment facility was upgraded from primary to secondary treatment and numerous pumping stations, storage reservoirs and lift stations were built or modified.



Bud was a member of American Water Works Association and Water Pollution Control Federation and a Montana certified operator.

Bud plans a leisure-filled retirement. His goals include lots of hunting, fishing, some woodworking and not too much work. He plans waiting on his wife, Barbara, for a few years, payment for the years of attention she has given him.

Bud's dedication and conscientious work for the PUD is appreciated by all his fellow workers and the citizens of Billings. His contributions to the field of water and wastewater treatment will be felt for many years to come.

Former DHES Division Head, Clay Brinck, Dies

Claiborne (Clay) W. Brinck died after a lengthy illness on January 7, 1986 in Helena. He was 73. Mr. Brinck spent many years with the State Department of Health working with the state's environmental health programs and was a familiar figure at the water and wastewater plants around the state.

He was a native of Butte. He received a bachelor's degree in chemical engineering from Montana State College and his master's degree in sanitary engineering from Harvard University.

Mr. Brinck began work for the State Health Department in April 1936. He took leave from his state job and served in the Sanitary Corp of the Army from 1943 to January 1946 and was discharged with the rank of captain. In 1950 he worked for the U.S. Public Health Service, stationed in Kansas City, MO. He then held a reserve commission of the U.S. Public Health Service, retiring from there in 1977 as a senior director with the rank of a captain in the Navy.

In 1951 Mr. Brinck returned to the Montana State Health Department as head of the Division of Environmental Sanitation retiring in 1972. During

this period, he was active in writing and promoting proposed legislation for environmental pollution control and in 1955 the Montana legislature passed Montana's comprehensive water pollution control act, the best in the nation at that time. In 1961 the legislature passed the sanitation in subdivision act, also one of the best in the nation for pollution control.

Mr. Brinck was a longtime member of the Presbyterian Church where he served as an elder. He was a member of the Helena Rotary Club, Sons of Norway and many professional organizations including the National Society of Professional Engineers, serving as the national director, the American Waterworks Association, serving as national director of that group and the Water Pollution Control Federation. He was named outstanding engineer by the Montana Society of Engineers. He received the George Fuller Award from the American Waterworks Association and the Arthur Sidney Bedell Award from the Water Pollution Control Federation.

He is survived by his wife, Doris, of 1234 Winne avenue, Helena, one daughter, three sons and nine grandchildren.

As professional wastewater operators, you can benefit from membership in the Water Pollution Control Federation's Professional Wastewater Operations Division (PWOD).

Why a division especially for operators?

WPCF recognizes that wastewater treatment professionals provide one of the most essential services in the environmental field. Operators have specialized interests and needs. WPCF created the PWOD to meet those needs.

How can joining a PWOD help me in my job?

As a member, you will receive *Operations Forum*, a new magazine dedicated to the needs of treatment plant operations, laboratory controls, collection systems, and maintenance personnel. *Operations Forum* is designed to help you, the wastewater operations specialist, improve your skills and maintain top system performance. Information on job advancement, improving your professional status, and enhancing your image in the community — these are all goals of the *Forum*.

What exactly will I read about in *Operations Forum*?

Topics that have been covered in *Operations Forum* include:

Laboratory Management — Sample collection and preservation, levels of precision, and quality control at laboratories in wastewater treatment plants.

Process Control Instruments — Selecting and using samplers, monitors, indicators, and recorders; the latest in new technology and equipment.

Operating a Package Plant — Is it really as simple as it sounds?

Sludge Disposal — Sludge disposal methods, equipment, and techniques for efficient management of sludge.

Annual Safety Survey — Results of WPCF's survey of accidents and injuries at U.S. and Canadian treatment plants.

Plus, in every issue, there is a Certification Quiz to keep you sharp, a Bulletin Board for the latest news, and information on operations in North America.

Are there other benefits?

Sure! Many benefits are available to you as a PWOD member in WPCF. You'll be eligible for substantial discounts on practical wastewater publications and for group insurance rates (including disability). WPCF has public education materials that can help you be an effective messenger of clean water information in your community. You know and WPCF knows how important operations professionals are to your community — now it's time the public learns about the essential services provided by wastewater operators.

Anything else?

WPCF's Annual Conference and Exposition is the largest of its kind. The week-long event attracts more than 10,000 participants who gather to attend technical sessions and review up to 300 manufacturers and firms exhibiting their equipment and processes at the Exposition. A discount for Conference registration is available to members. As a PWOD member, you may choose to "add on" a subscription to the widely acclaimed *Journal Water Pollution Control Federation* as well as *Highlights*, WPCF's monthly newsletter, at a reduced subscription rate.

How much will it cost me to join?

Membership in the Professional Wastewater Operations Division is \$15 annually, plus local dues of your Montana WPCA of \$5.00.

I've heard about WPCF; what exactly is it?

Since 1928 the Water Pollution Control Federation has been the leader in developing and disseminating information concerning the nature, collection and treatment of domestic and industrial wastewater. We're a non-profit, educational organization of distinguished wastewater problem solvers. Throughout the last 56 years, it has been WPCF members, some 30,000 strong today, that have been the driving force behind the nation's clean water program.

Where can I sign up to become a PWOD member of WPCF?

An application follows — just follow the instructions. And, tell your fellow operators that they now can join a professional organization too.

Application for Membership

Professional Wastewater Operations Division (PWOD)

**WATER POLLUTION
CONTROL FEDERATION**
2626 Pennsylvania Ave., N.W.
Washington, DC 20037
(202) 337-2500

**MONTANA WATER
POLLUTION CONTROL
ASSOCIATION**
c/o Joe Steiner
Billings Public Utilities Dept
Box 30958
Billings, MT 59111
657-8352

Use this application to become a PWOD member of the Montana Water Pollution Control Association and the Water Pollution Control Federation.

The member of the Federation qualifying for the PWOD must be actively employed by the responsible operating entity on the facility site on a day-to-day basis in the operation and maintenance of wastewater collection facilities, wastewater treatment facilities, or wastewater laboratories provided for such treatment facilities.

Name _____ Telephone _____

Employer _____

Address _____

City/State/Zip _____

Job Category. Please check one:

- | | |
|---------------------------------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> Local/Regional Government or Agency (11) | <input type="checkbox"/> Private Firm (21) |
| <input type="checkbox"/> State/Interstate Government or Agency (13) | <input type="checkbox"/> Industry (27) |

Member Association Dues	\$ 5.00
WPCF Dues	\$ <u>15.00</u>

SUBTOTAL	\$ 20.00
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Add-On Benefit (Optional) <i>Journal and Highlights</i>	\$ <u>40.00</u>
------------------------------------------------------------	-----------------

Please Total	\$ _____
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Bill Me ☐ Amount Enclosed \$_____.

Please send your completed application and make checks payable to:

Water Pollution Control Federation
Data Management, 2626 Pennsylvania Ave., N.W., Washington, D.C. 20037

**Water Quality Bureau
Department of Health and
Environmental Sciences
Room A-206, Cogswell Building
Helena, Montana 59620**

TO:

1,750 copies of this public document were published at an estimated cost of 91¢ per copy, for a total cost of \$1,592.50, which includes \$1,400.00 for printing and \$192.50 for distribution.